Project Hawkeye 1

Critical Design Review (CDR)

29th August 2025

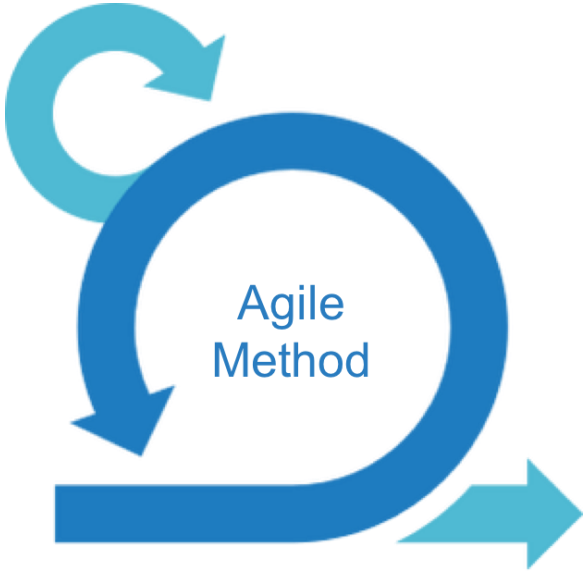
Agenda

- Design and Development Approach
- System Design
  - System Architecture Overview
  - Security
  - Data Backup
  - Data Archival and Housekeeping
  - Export Data to Link Analysis software
- Software Features
  - Workflow
  - Features
- Data Migration Tool
- DBMS UI Demo

Design and Development Approach

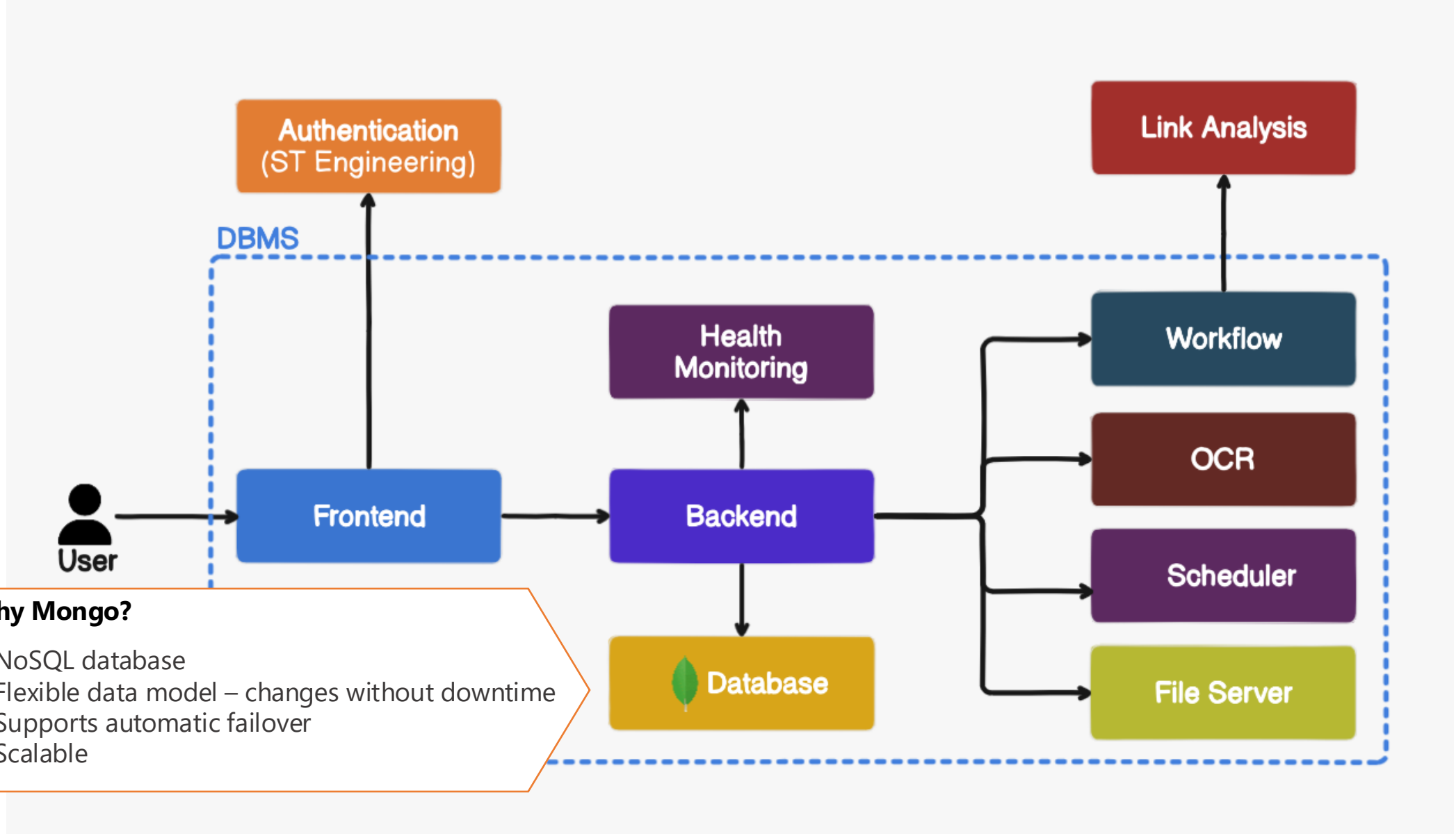
- Agile methodology is adopted as the design and development approach, which provides a flexible and adaptive approach.

- Two software verification and iteration are scheduled:
  - Oct 2025;
  - Jan 2026;



System Design

System Architecture Overview



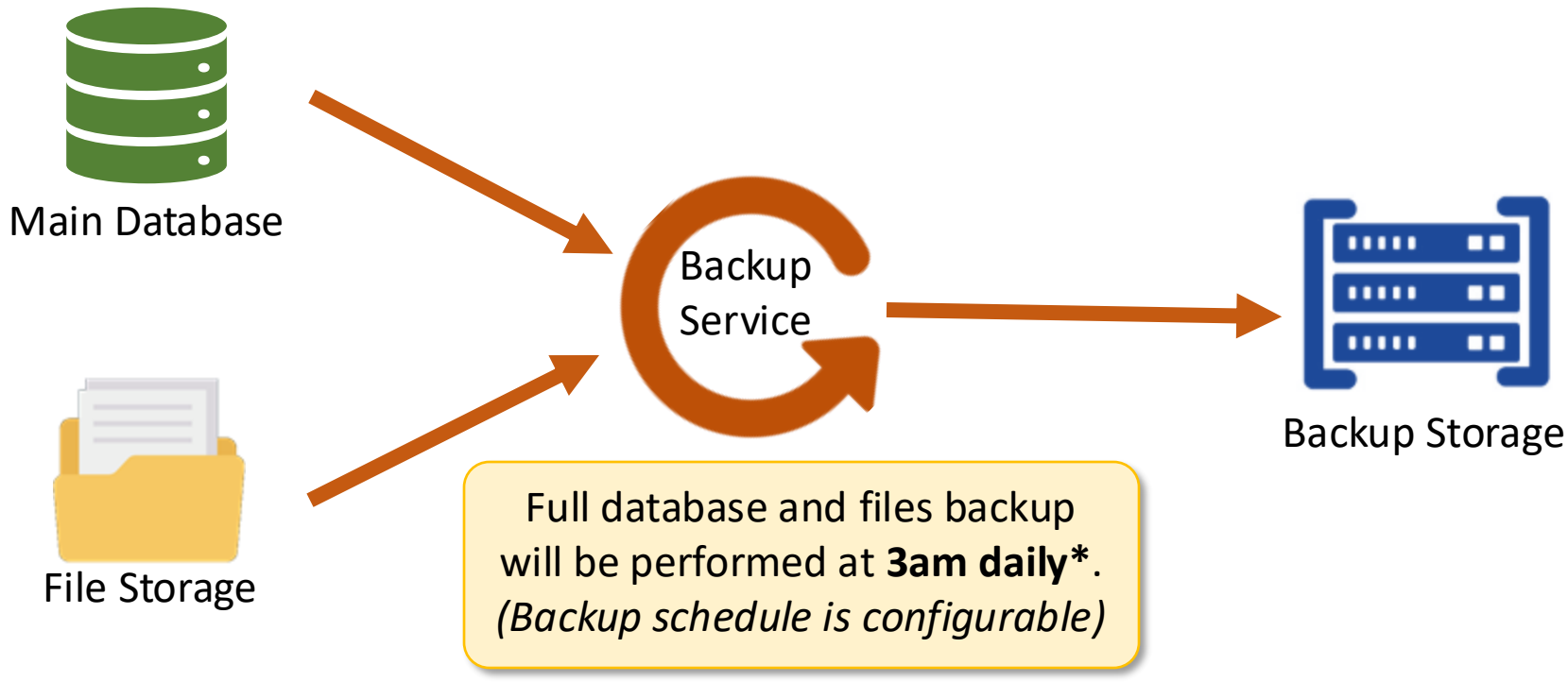
Why Mongo?

- NoSQL database
- Flexible data model – changes without downtime
- Supports automatic failover
- Scalable

Security

Key Areas	Design Approach
Infrastructure & Servers	• All servers and infrastructure shall be hardened (AFE); • All servers shall installed with anti-virus/malware software to scan for vulnerabilities regularly;
Data Protection	• Implement TLS (Cryptographic protocol) to provide data encryption for communication over the network;
Authentication & Authorisation	• Use Keycloak for authentication and role-based access control
Security Testing	• Use SonarQube to run SAST (Static Analysis) regularly, which can detect security vulnerabilities
Security Monitoring	• Implement logging and auditing to track user access and changes to data; • Monitor logs, detect anomaly behaviour

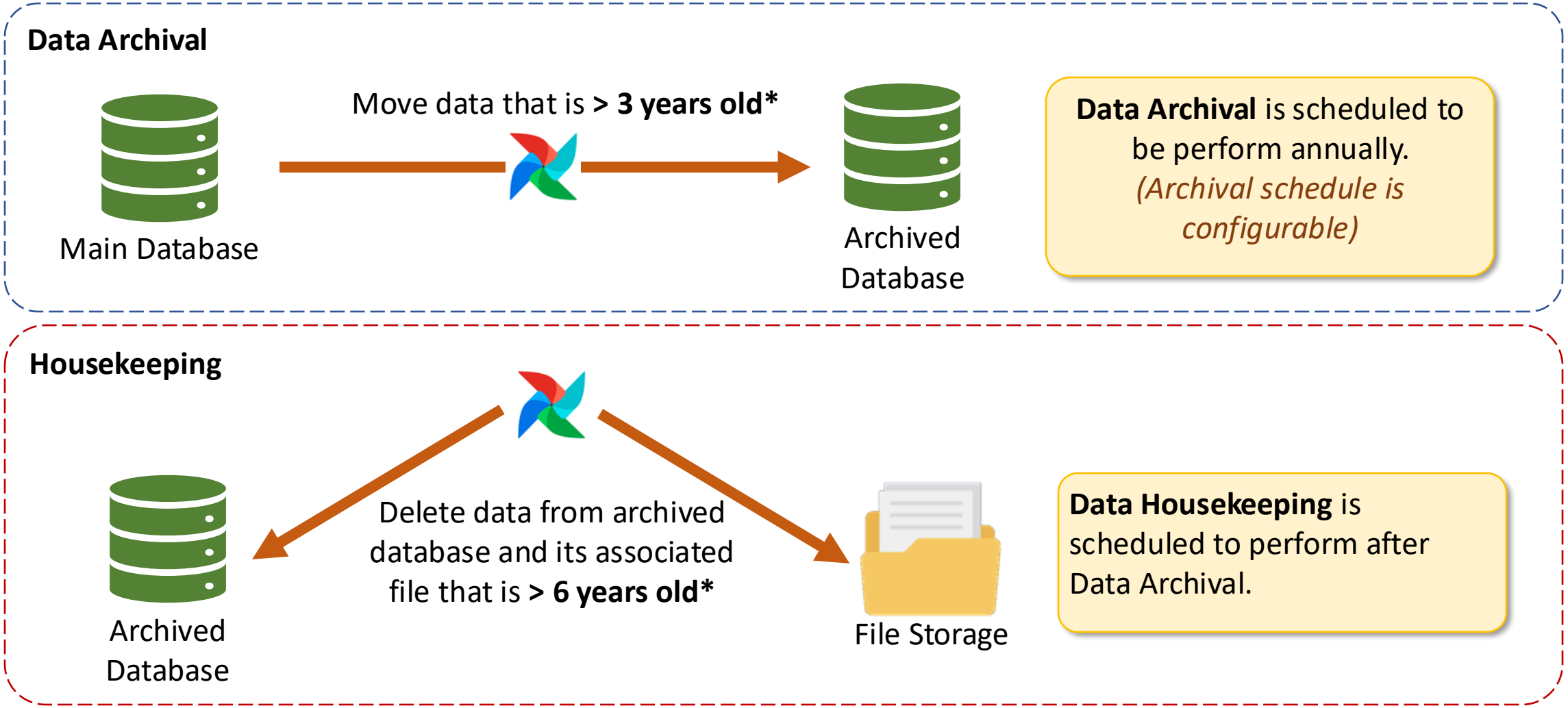
Data Backup



* - Default setting & value is configurable

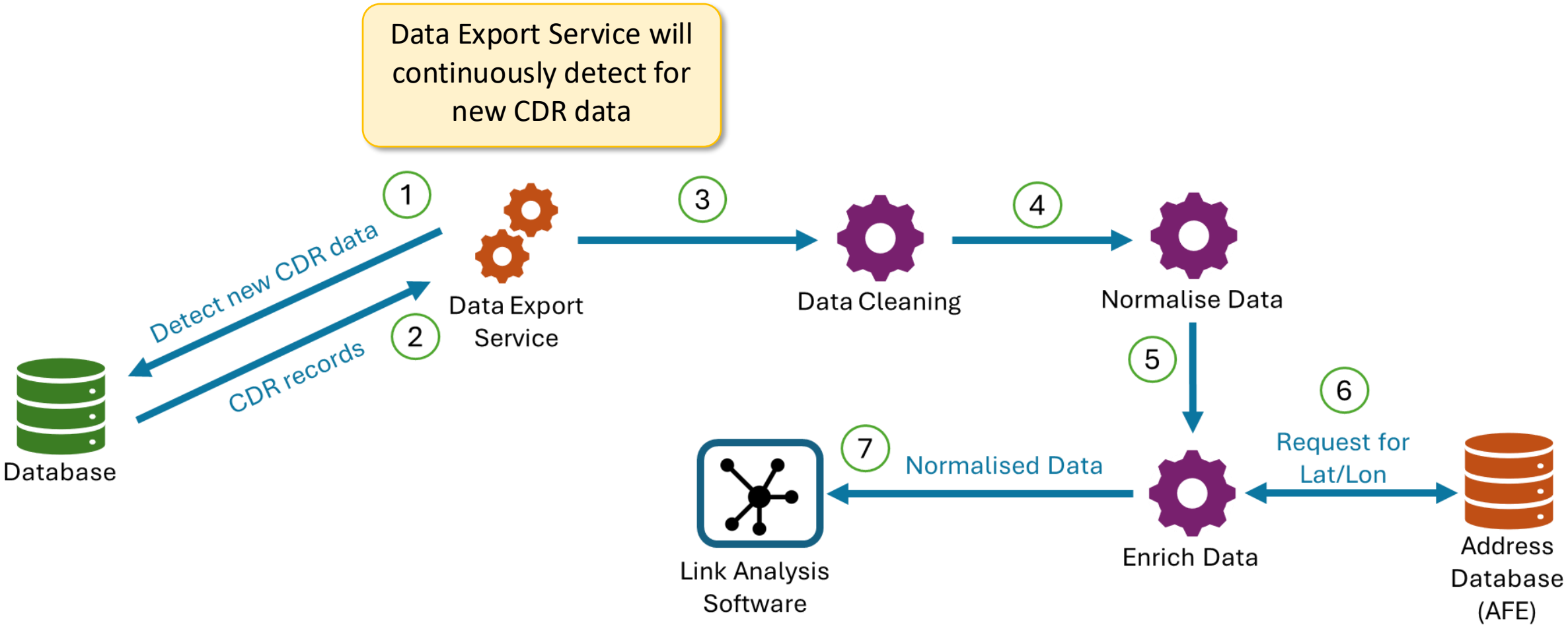
Data Archival & Housekeeping

- Default data retention period is 3 years. This is configurable.



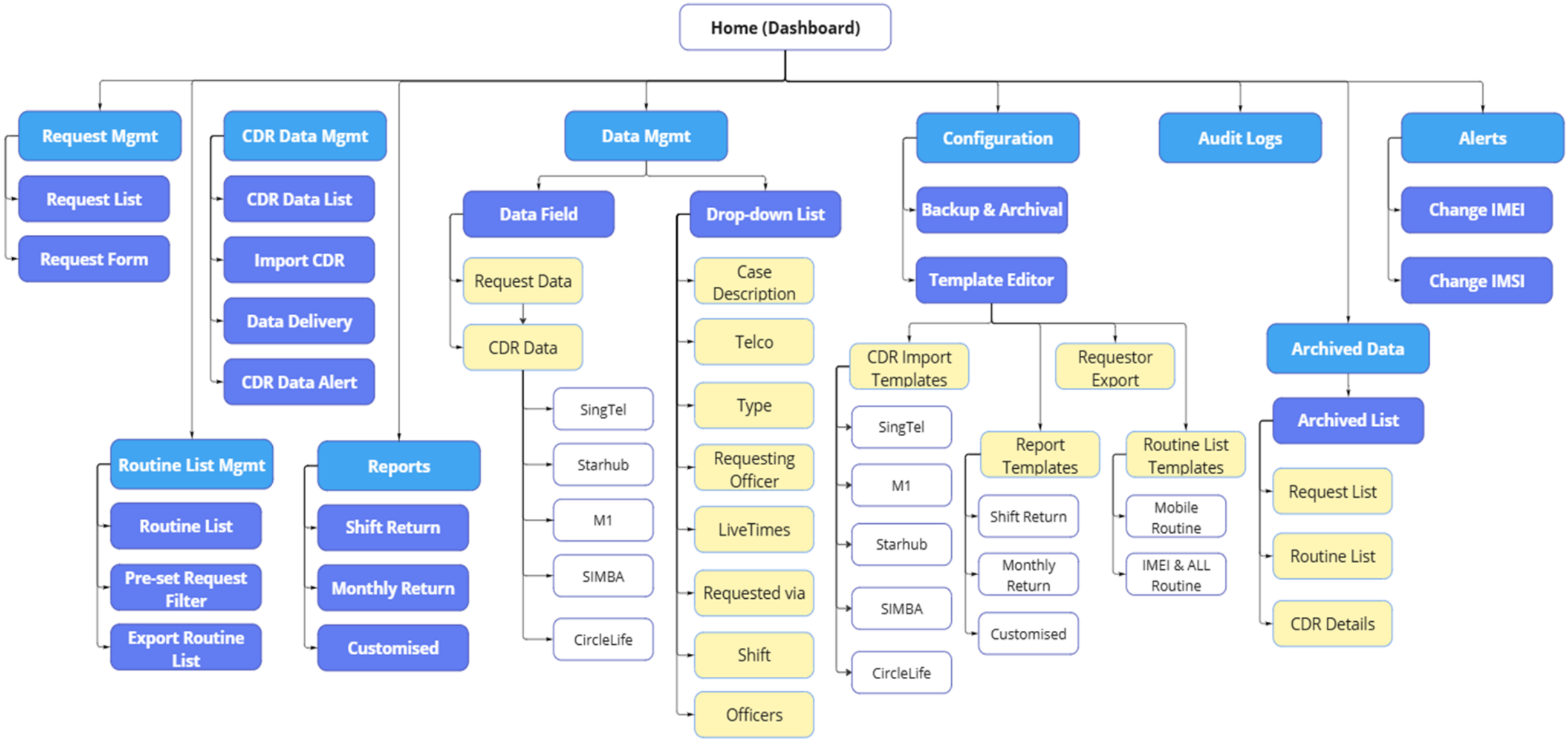
* - Default setting & value is configurable

Export data to Link Analysis



Software Features

DBMS Features



Dashboard

Shows the number of new requests for each telco per week.

CDR & SS value includes urgent requests

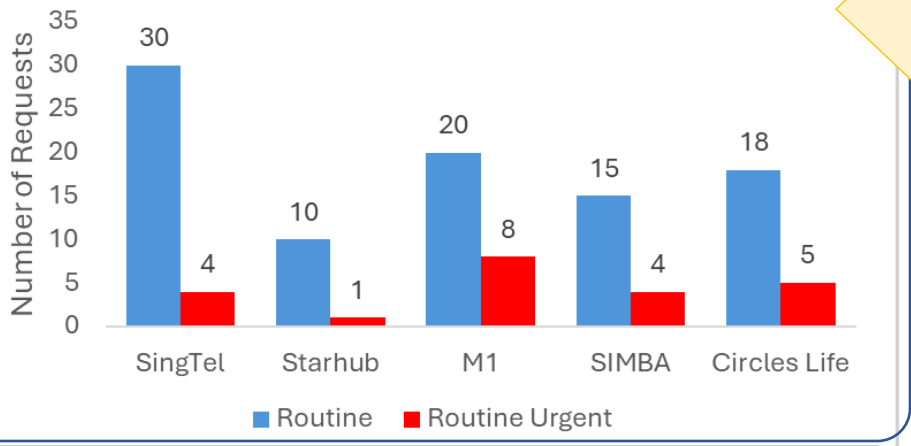
Total urgent requests (CDR + SS)

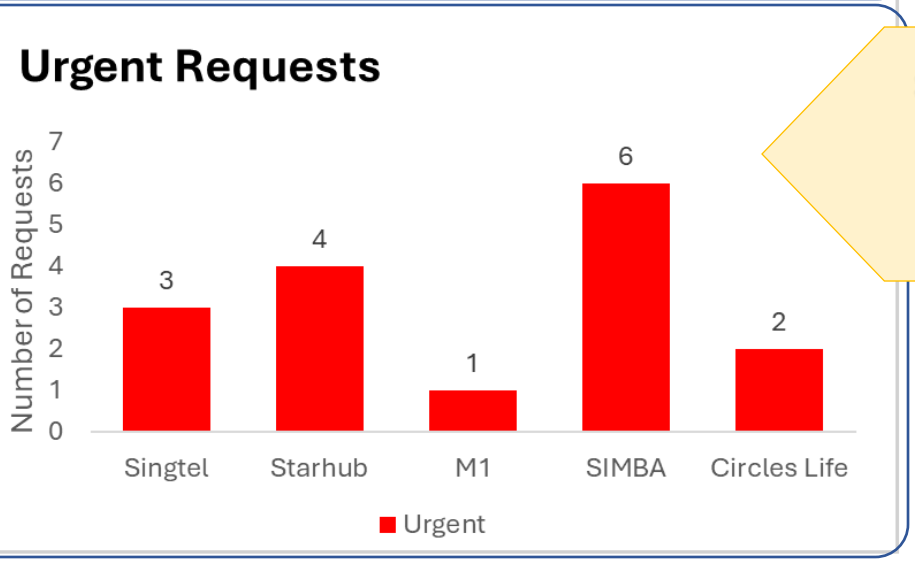
Shows total number of CDR requests for each telco per week.

Shows request completion progress for each dept

Shows total number of Urgent requests for each telco on weekly basis, including both CDR and SS requests.

Completed(%) = Total number of requests fulfilled / Total requests from dept

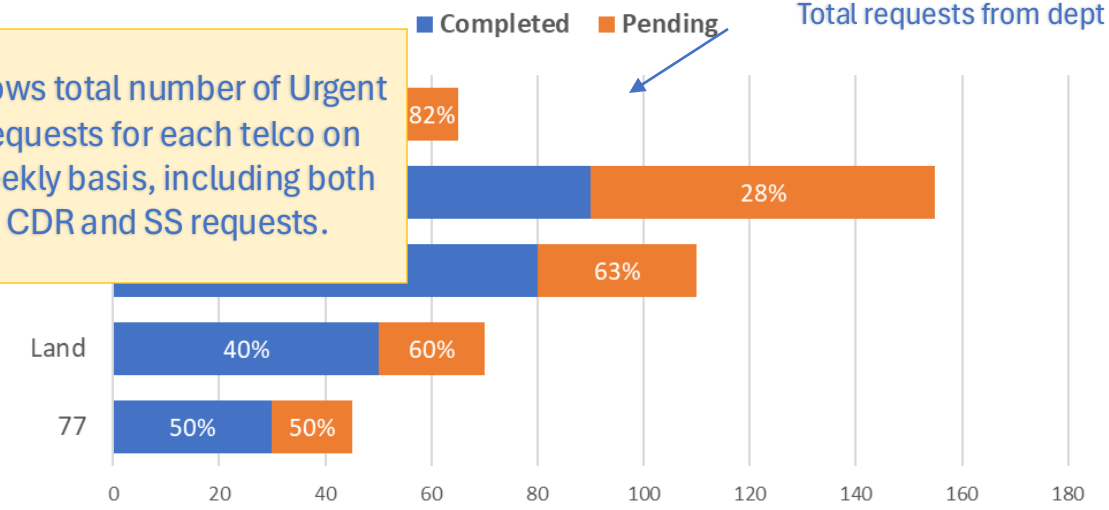




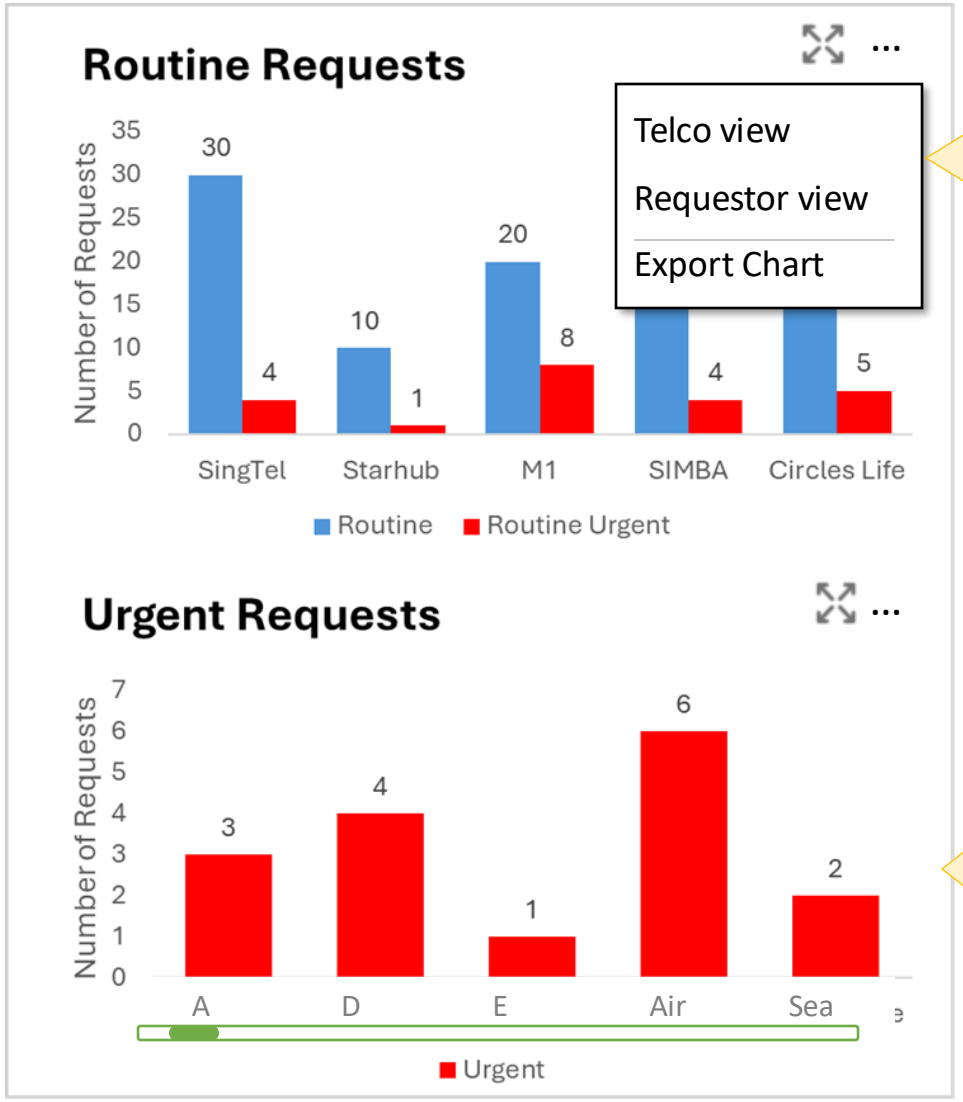
r Week

	SS	CTC	Urgent
	15	20	3
Starhub	10	10	4
M1	20	0	1
SIMBA			6
Circles Life			2

Total Requests
100



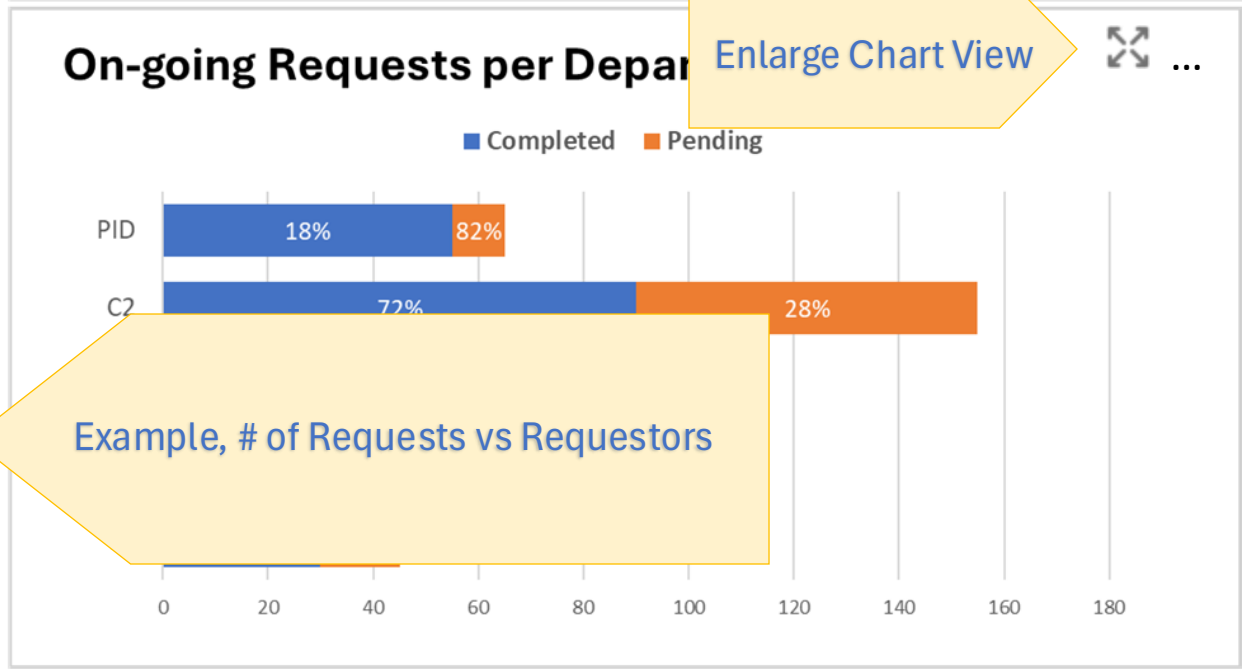
Dashboard Features



Able to switch view between

- Telco view - # of Requests vs Telcos
- Requestor view - # of Requests vs Requestors

Enlarge Chart View



Example, # of Requests vs Requestors

Type of Requests

CDR

- Routine CDR Request
- Urgent CDR Request
- Routine-Urgent CDR Request

SS

- Routine SS Request
- Urgent SS Request

CTC

- CTC Request

Request Created via

1) Manual key in

2) Import form with **structured data** (Auto-populate)
   - Using OCR for PDF;
   - Word/Excel;
   - Table in Email content/body (.MSG/PDF format)

3) Import form with **unstructured data** (Email)
   - View content from Email;
   - Select and copy Email content;
   - Paste the copied content to the request form

4) Duplicate from existing requests

Request Extension

- Types of extension:
  - Extend **Request Period** (applies to request start and end date)
  - Change **Service Provider**
  - Change **Project Name**

Request can be extend via

1) Manual key in

2) Import form with **structured** data
   - Using OCR for PDF;
   - Word/Excel;
   - Table in Email content/body

3) Import form with **unstructured** data (Email)
   - View content from Email;
   - Select and copy Email content;
   - Paste the copied content to the request form

Request Form (OCR)

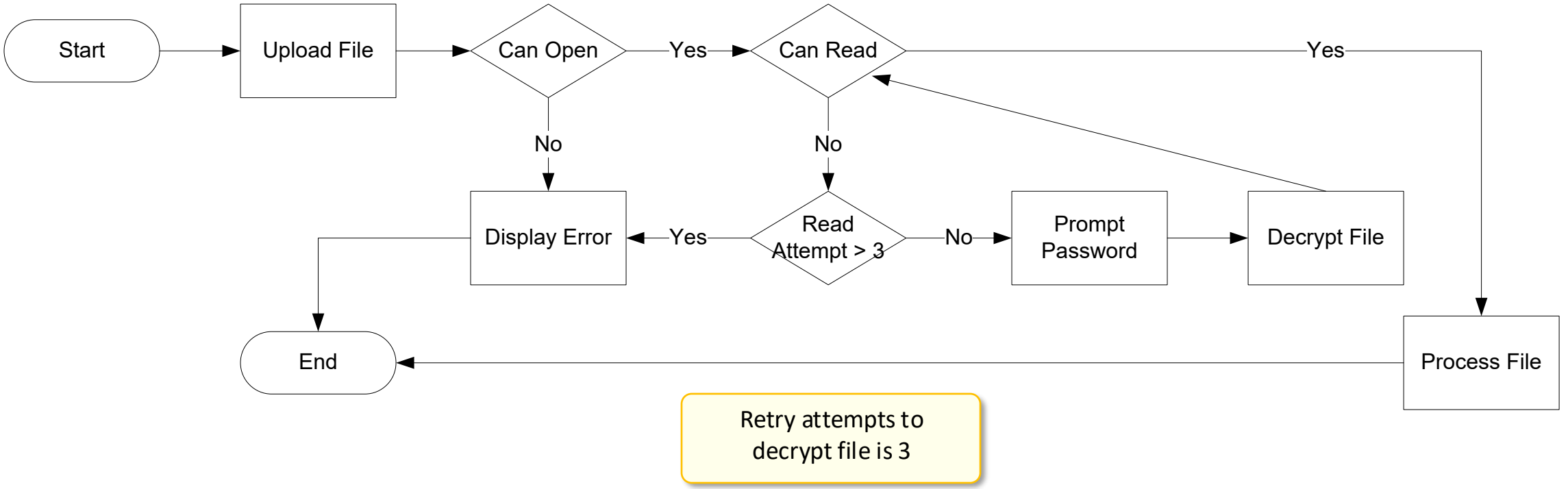
- Improve OCR accuracy:

  - ✓ Tested multiple CDR sample forms with the refined pdf text extractor, which yields high accuracy;

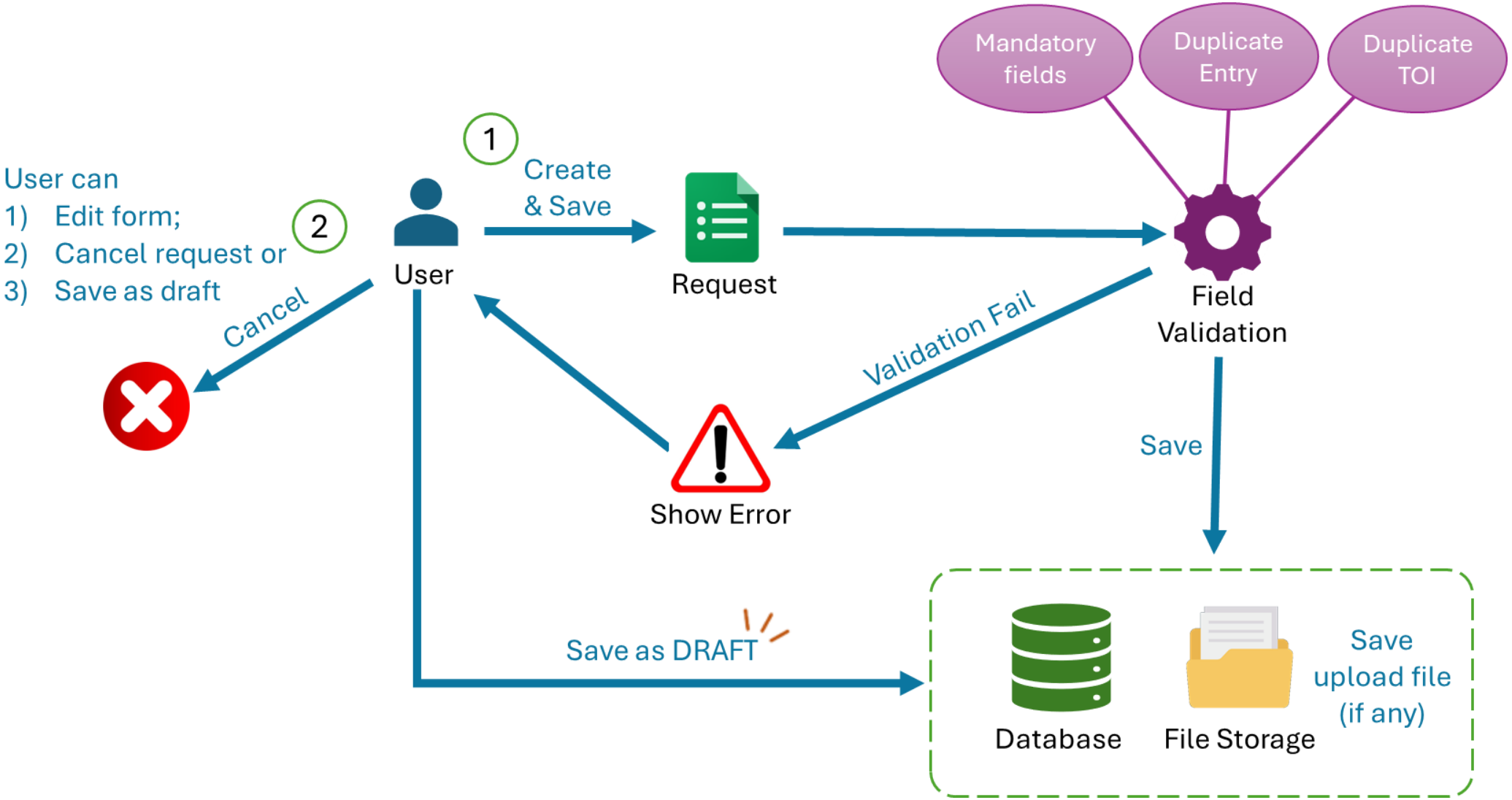
  - ✓ When the **new** Request Form Design is approved,
    - Get the **new** Request Form template and samples;
    - Consult ST/User on creating and populating the form with synthetic data, which should be as close to the actual operational data as possible;
    - Verify the performance and observe its accuracy through more tests.

Uploading encrypted files

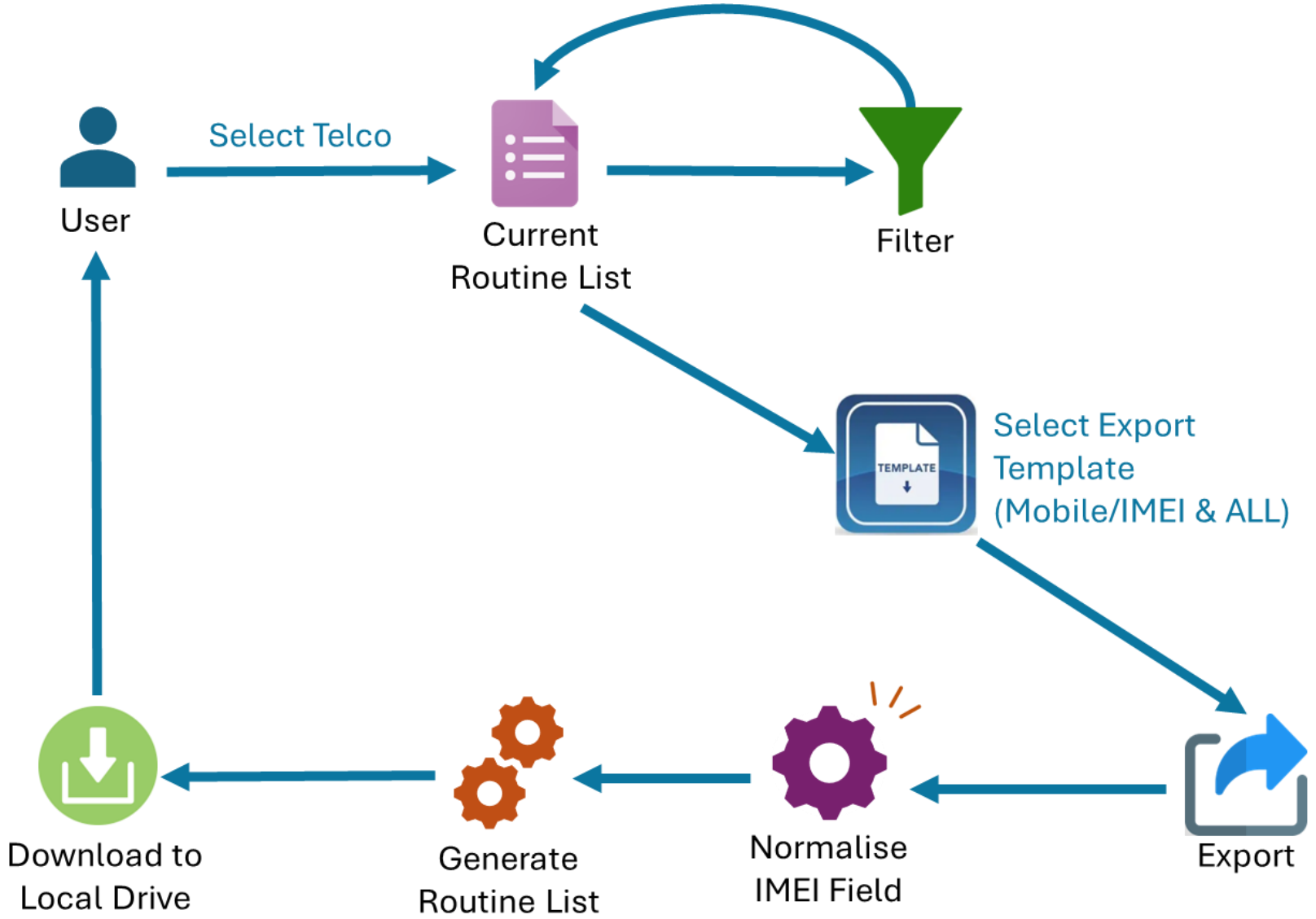
- Provide the capability of decrypting AES-Encrypted file.
- Upon
  - Uploading request forms or email;
  - Uploading CDR zip folders from Telcos;



Request Creation (CDR/SS/CTC)



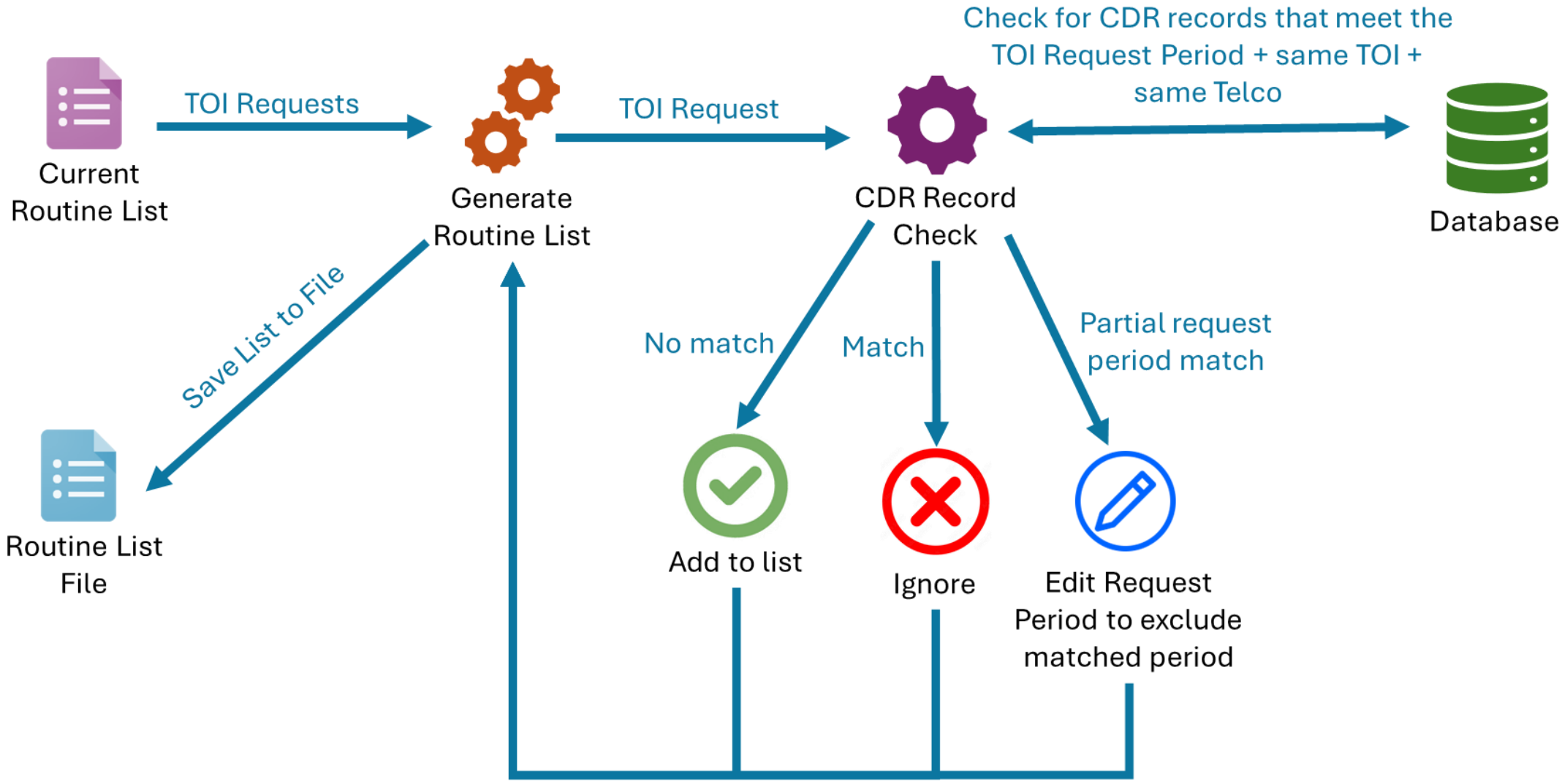
Request Data from Telco (CDR)



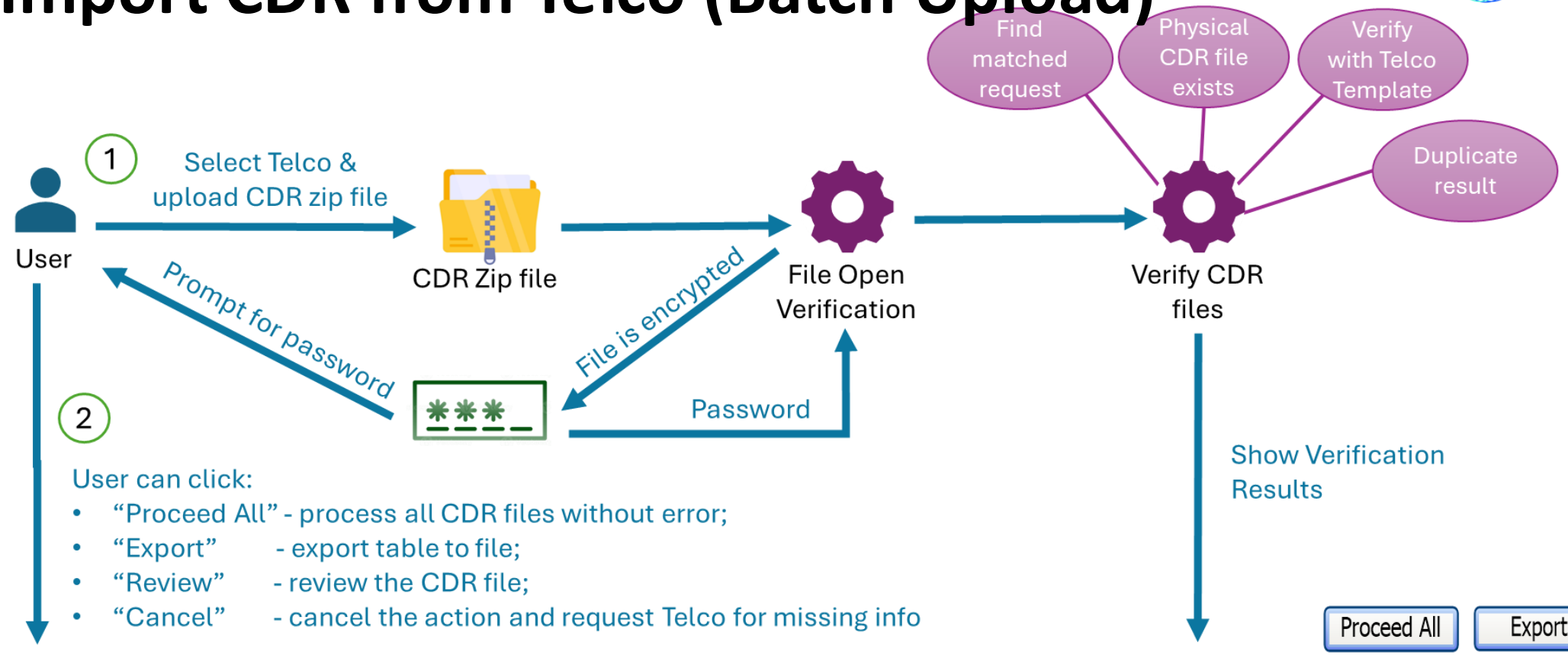
IMEI Normalisation

Take the 1st 14 digits from IMEI field and append "0" at the last digit.

Generate Routine List



Import CDR from Telco (Batch Upload)



TOI	Request Start Date	Request End Date	Request Found	CDR File Exists	Non duplicate	Valid Headers	Action	Status
92322544	13/08/2025	15/09/2025	✓	✗	N/A	N/A		Uploaded
94320343	13/08/2025	31/01/2026	✗	N/A	N/A	N/A		Error
91246743	15/08/2025	05/12/2025	✓	✓	✓	✓	Proceed	Pending
83205483	01/08/2025	01/11/2025	✓	✓	✓	✗	Review	Pending
83437745	29/07/2025	01/09/2025	✓	✓	✓	✗	Review	Pending
83423433	29/07/2025	01/09/2025	✓	✓	✗	N/A		Ignore

Verify CDR file with Telco Template (Review)

1 All column headers from CDR data file matches with template

	Template Header	CDR File Header
1	Date	Date
2	Time	Time
3	Subscriber No	Subscriber No
4	IMEI	IMEI
5	IMSI	IMSI
6	TIMSI	TIMSI
7	Duration	Duration
8	Answer Status	Answer Status
9	Destination No.	Destination No.
10	Call Dirn	Call Dirn
11	Roaming form	Roaming form
12	Call Type	Call Type
13	First_LAC	First_LAC
14	First_Cell	First_Cell
15	First_Start Location	First_Start Location

2 Extra column header detected from CDR data file

	Template Header	CDR File Header
1	Date	Date
2	Time	Time
3	Subscriber No	Subscriber No
4	IMEI	IMEI
5	IMSI	IMSI
6	TIMSI	TIMSI
7	Duration	Duration
8	Answer Status	Answer Status
9	Destination No.	Destination No.
10	Call Dirn	Call Dirn
11	Roaming form	Roaming form
12	Call Type	Call Type
13	First_LAC	First_LAC
14	First_Cell	First_Cell
15	First_Start Location	First_Start Location
		eSIM

+ Add new

Redirected to Template Editor on Designer Role

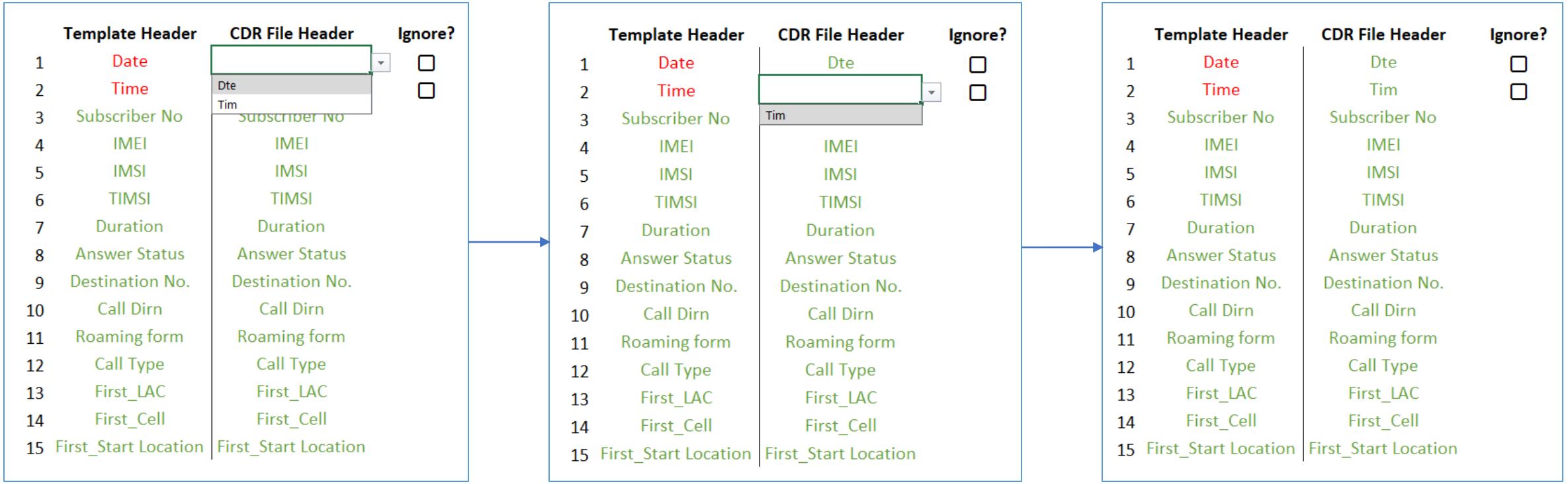
3 Missing column header detected from CDR data file

	Template Header	CDR File Header	Ignore?
1	Date	Date	
2	Time	Time	
3	Subscriber No	Subscriber No	
4	IMEI	IMEI	
5	IMSI	IMSI	
6	TIMSI	TIMSI	
7	Duration		☑
8	Answer Status	Answer Status	
9	Destination No.	Destination No.	
10	Call Dirn	Call Dirn	
11	Roaming form	Roaming form	
12	Call Type	Call Type	
13	First_LAC	First_LAC	
14	First_Cell	First_Cell	
15	First_Start Location	First_Start Location	

Select checkbox to proceed with data processing with missing column

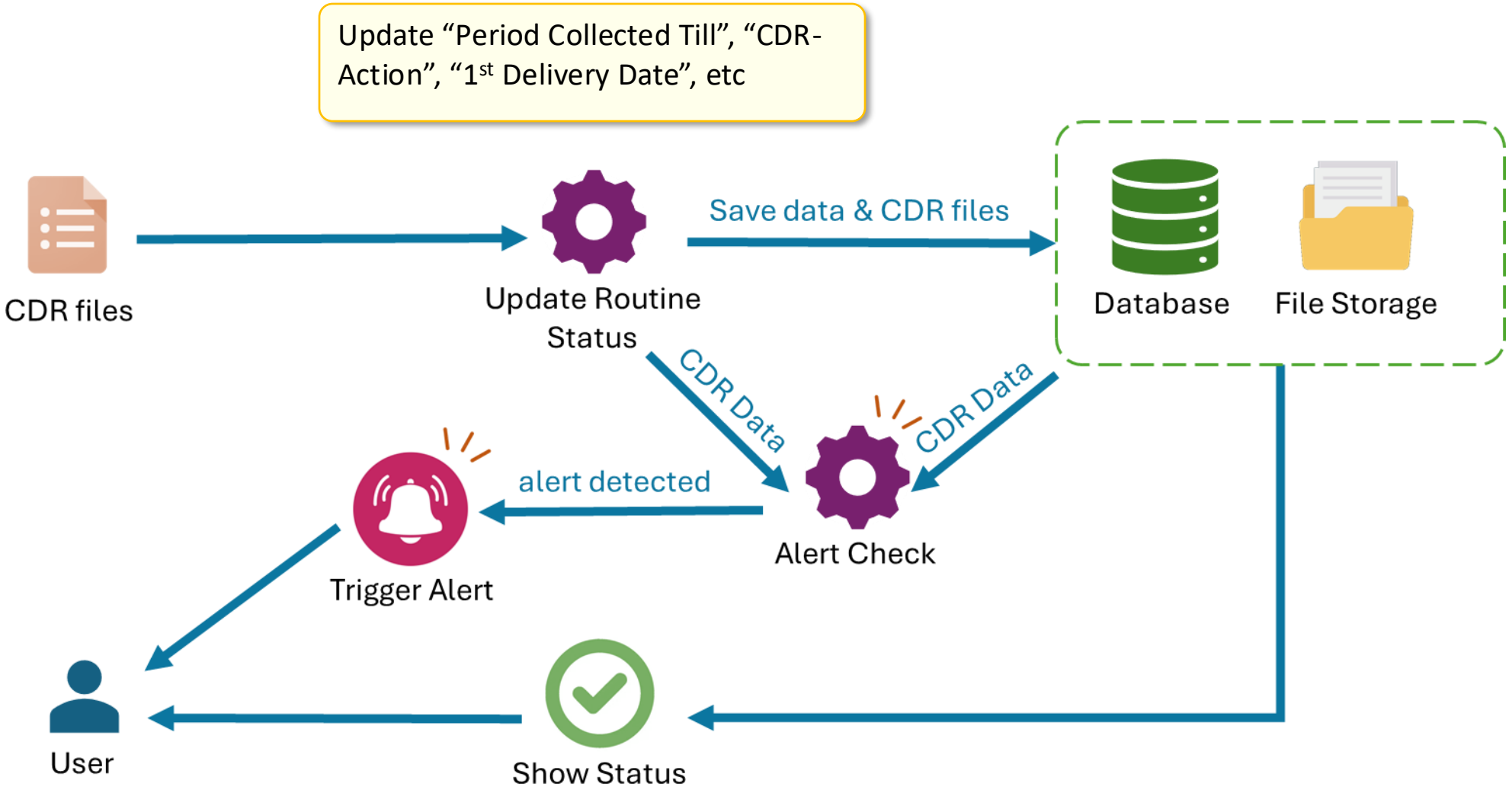
Verify CDR file with Telco Template (Review)

4 **Spelling error on headers in CDR. System unable to detect and match with template.**

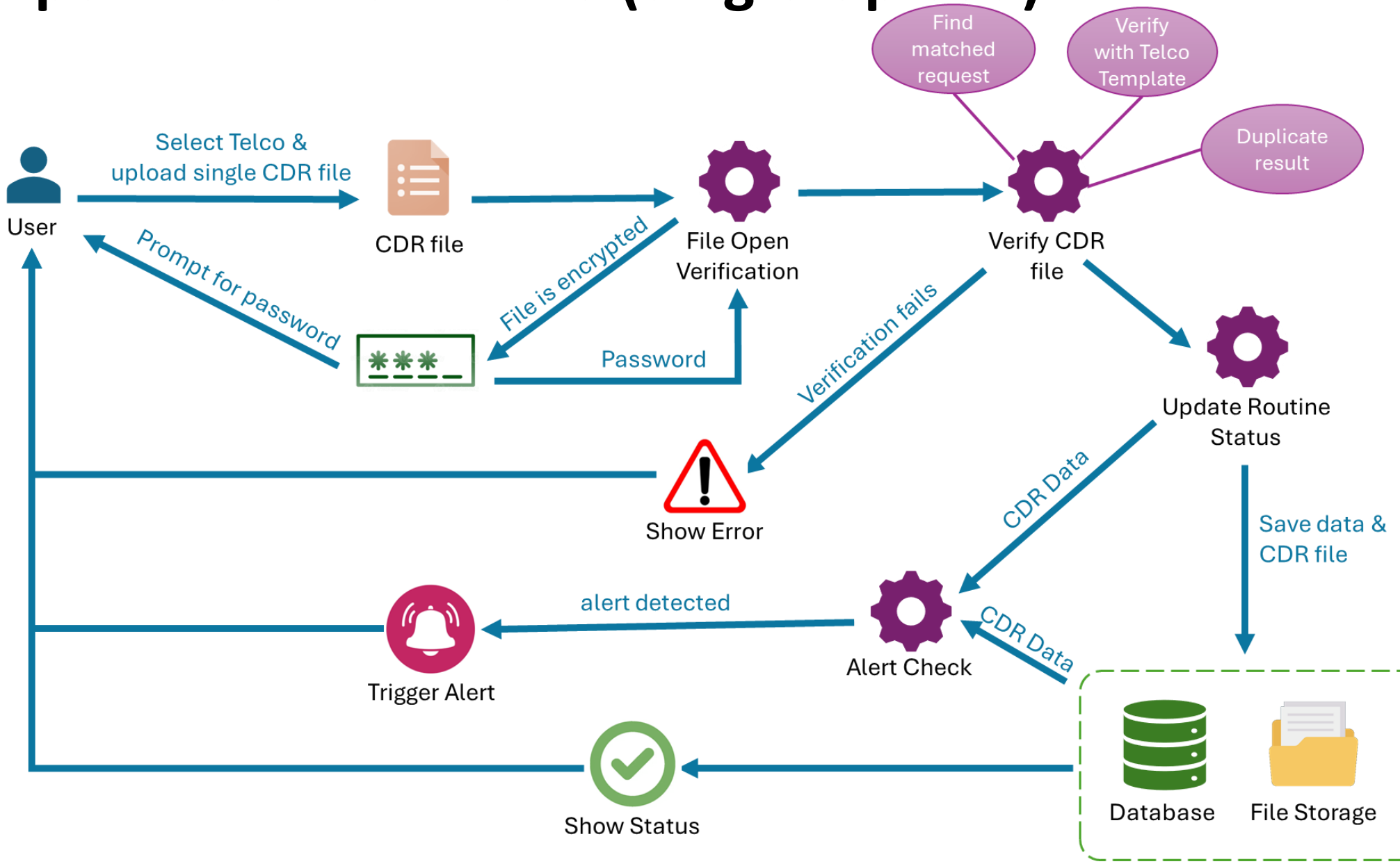


- Users must manually match the CDR columns to the template headers.
- Any misspelled column headers that were not automatically detected should be selected by the user from a dropdown list.

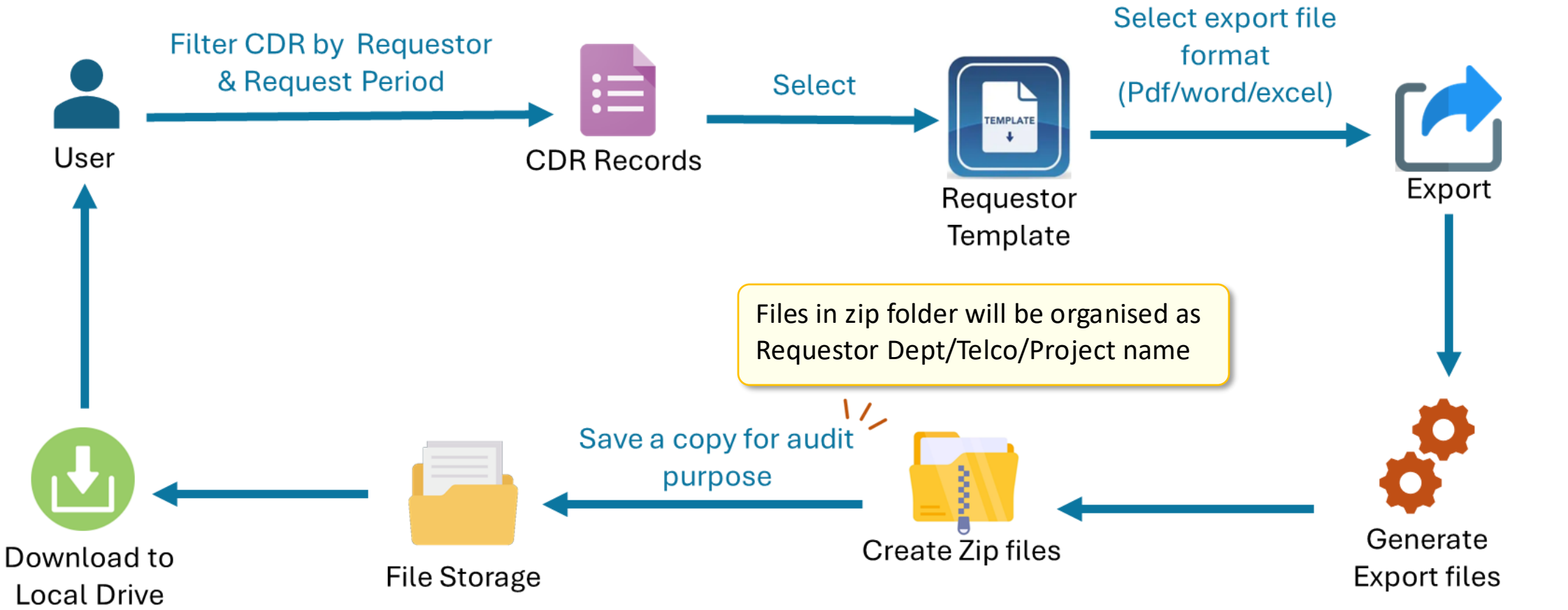
Import CDR data from Telco (Batch Upload - Save)



Import Data from Telco (Single Upload)

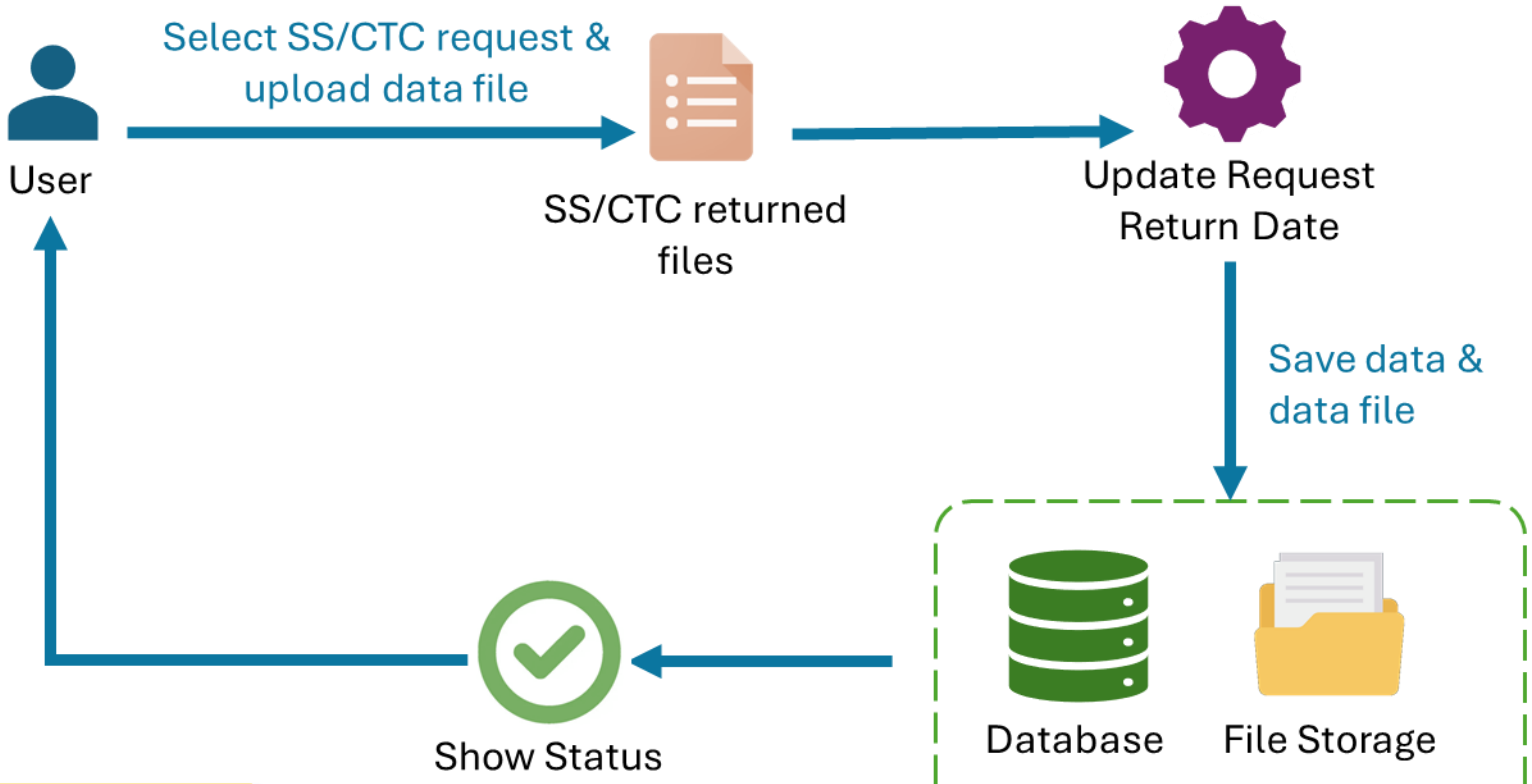


Request Delivery (CDR)



If TOI has no data from the requested period, a blank [TOI].txt file will be generated

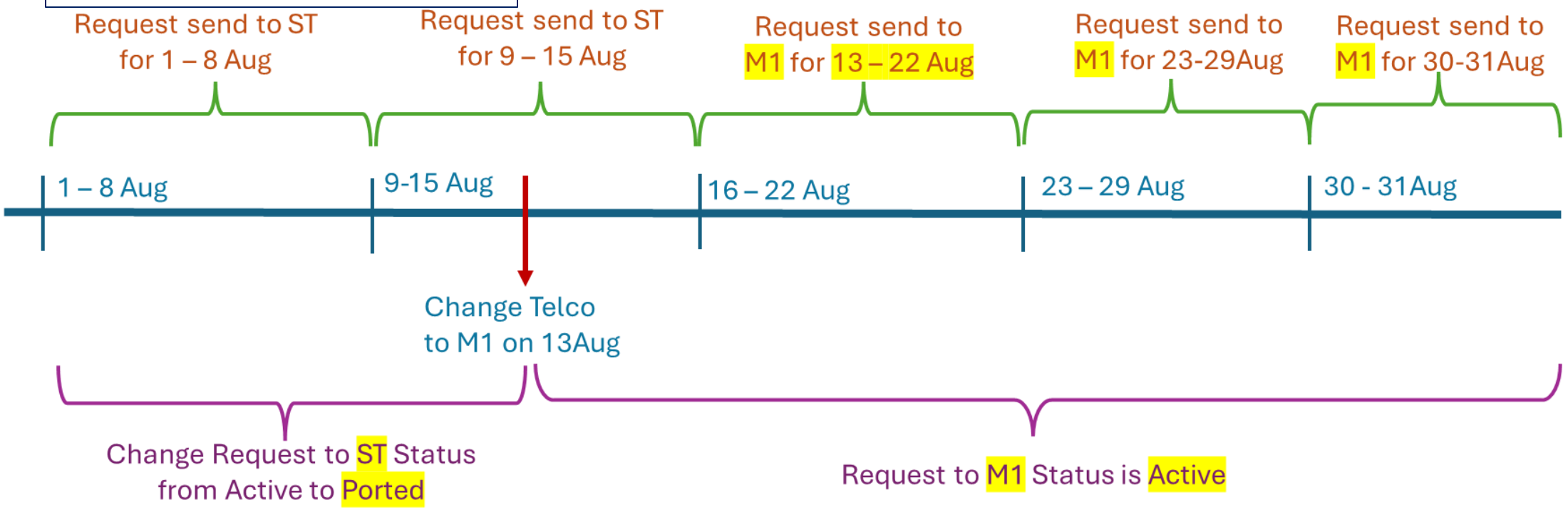
Import data files for SS/CTC requests



The purpose is to keep the raw file and no need to process the file

Change Service Provider

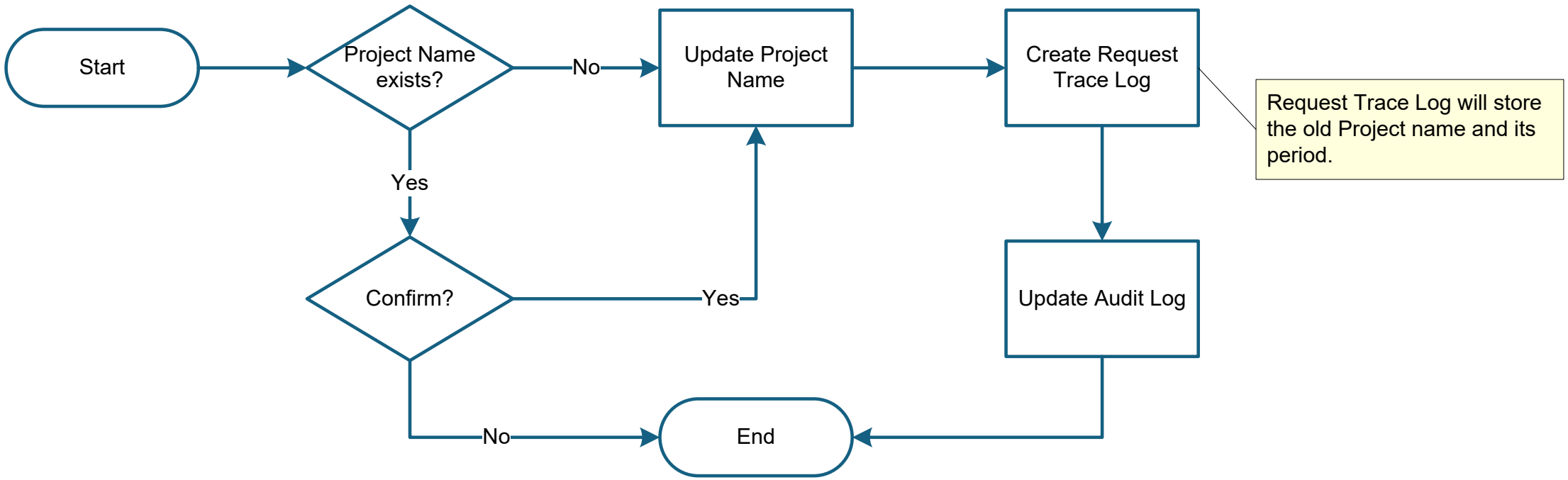
TOI: 91234567
Period: 1st Aug 25 to 31 Aug 25
Telco: ST
Status: Active



TOI: 91234567 Period: 1st Aug 25 to 12 Aug 25 Telco: ST Status: Ported	TOI: 91234567 Period: 13 Aug 25 to 31 Aug 25 Telco: M1 Status: Active

Change Project Name

- Two types of changes:
  - Change Project name to existing Project name
  - Change Project name to new Project name



Report Templates

- Estimated 25 report templates (including ad-hoc, which not frequent)

Reports	Format
Shirt Return Report (Day/Night/Management/Urgent)	Excel
Monthly Report (Statistics/Telco)	Excel
Routine list (Weekends/weekday)	Excel
Ad hoc Statistics Report (Telco/Requestor/Project/Yearly/Monthly/Type…)	Word/PDF
Comparison Report with Graph/Charts representation	Word/PDF

- Formulas includes:
  - pivot table, total, highest, lowest, median, avg, ratio etc - est 15 formula

- We will re-visit the other report templates during workshop

Alerts

- DBMS shall able to show alerts on the screen based on the rule-based conditions as shown in the Alert Templates below.

- Types of alert:
  - Change IMEI;
  - Change IMSI;

- Alert is configurable by the user

- Alert notification:
  - Alert Icon shown at status bar;
  - View the alert trigger time and details;

Alert Templates	
Field	**Value**
Alert Name	91234567 change IMEI Alert
Entities	91234567
Time Period – Start	2nd Aug 2025
Time Period – End	7th Aug 2025
Event	Change IMEI

Event: Change IMEI / Change IMSI

Data Migration Tool

- Data Migration from Access database to DBMS:

Challenges

- No access to current Access database

Proposed Approach

- User to provide the Access database schema;
- User export data from Access to Excel file according to Access database schema;
- EAS to provide a data migration tool:
  - Import the excel file;
  - Read the file and populate data to DBMS database;

DBMS UI Demo

Thank you!